

What we claim is:

1. A nucleic acid molecule encoding functional ALS which has (a) an alanine-to-threonine substitution at amino acid sequence position 122, or (b) an alanine-to-valine substitution at amino acid sequence position 205, relative to the amino acid sequence alignment of Figures 1 and 2.
2. A transformation vector comprising the nucleic acid molecule of claim 1.
3. A host cell comprising the nucleic acid molecule of claim 1.
4. A host cell of claim 3 which is a plant cell or a bacterial cell.
5. A host cell of claim 4 which is an imidazolinone-resistant plant selected from the group consisting of *Arabidopsis thaliana*, maize, soybean, wheat, cotton, canola, rice and sunflower.
6. A host cell of claim 4 which is recombinant.
7. A transformed plant exhibiting imidazolinone resistance having a nucleic acid molecule which comprises: (a) an exogenous promoter region which functions in a plant cell to cause the production of a mRNA molecule; (b) a structural nucleic acid molecule encoding functional ALS comprising an amino acid sequence of SEQ ID NO: 3 or SEQ ID NO: 4 or SEQ ID NO: 26 or a homolog thereof having an alanine-to-threonine substitution at position 122 or an alanine-to-valine substitution at position 205, and (c) a 3' non-translated sequence that functions in the plant cell to cause termination of transcription and addition of polyadenylated ribonucleotides to a 3' end of the mRNA molecule.
8. The transformed plant according to claim 7, wherein said plant is selected from the group of rice, cotton, wheat, canola, maize, soybean and *Arabidopsis thaliana*.

9. The transformed plant of claim 8 wherein the structural nucleic acid molecule has a nucleic acid sequence of SEQ ID NO: 1 or SEQ ID NO:2 or SEQ ID NO: 25 or homologs thereof which encode an ALS with an alanine-to-threonine substitution at position 122 or an alanine-to- valine substitution at position 205.

5 10. A method of conferring imidazolinone-specific resistance to a plant cell which comprises providing the plant cell with the nucleic acid sequence of claim 1.

11. A nucleic acid construct comprising the sequence of claim 1 linked to a gene encoding an agronomically useful trait.

12. A method of conferring imidazolinone resistance to a plant comprising providing  
10 said plant with a nucleic acid molecule of claim 1.

13. A method for determining the imidazolinone tolerance of a plant comprising detecting the presence of a nucleic acid molecule of claim 1.

14. A method for introgressing an agronomically useful trait into a plant comprising:  
(a) constructing a vector comprising SEQ ID NO: 1 or SEQ ID NO: 2 or SEQ ID NO: 25  
15 or homologs thereof which encode an alanine-to-threonine substitution at position 122 or an alanine-to-valine substitution at position 205, operably linked to a gene for said agronomically useful trait; (b) transforming said vector into plant cells; (c) growing plant; and (d) testing plant for introgression of said trait by selecting plants with imidazolinone resistance.

20 15. A method using imidazolinone resistance as a selectable marker in a cell or organism wherein said resistance is provided by nucleic acid molecule of claim 1.

16. A set of primer pairs for amplifying an ALS gene or fragment thereof comprising at least two oligonucleotides selected from the group consisting of SEQ ID NO: 5 through SEQ ID NO: 24.